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A Faunistic study on Ichneumonidae(Hymenoptera) in Türkmen Mountain, Turkey

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A b s t r a c t : In this study, Ichneumonidae fauna of Türkmen Mountain in Eskişehir province was investigated between May 2009 and November 2009. Totally 15 species belonging to 15 genera and 9 subfamilies were found; 5 species from Pimplinae, 2 from both Tryphoninae and Cryptinae, 1 from each of Tersilochinae, Cremastinae, Ichneumoninae, Diplozantinae, Banchinae, and Metopiinae. 2 species noted in the text by asterisk are new records for Turkey fauna. The synonyms, hotspots, general distribution of all species and distribution in Turkey were given on the basis of literature.

K e y w o r d s : Ichneumonidae, fauna, Türkmen Mountain (Eskişehir), new records, Turkey.

Introduction

The Ichneumonidae of Turkey has not been studied well, although it is among the most interesting zoogeographical sections of the Western Palearctic region. In the catalogue of KOLAROV (1995) only 383 species were listed. Lately some new records have been added to this fauna (KOLAROV et al. 1997, 1999; YURTCAN et al. 1999; YURTCAN et al. 2002; ÇORUH et al. 2002, etc.), predominantly from Thrace, Western and Northeastern Turkey. There are several studies about Ichneumonidae in Central Anatolia Region. ÖZDEMİR (2001) listed totally 24 species, 13 species of them from Diplazontinae and 11 from Tryphoninae were obtained. 12 species noted new records for Turkey. The biodiversity hotspots hold especially high numbers of endemic species, yet their combined area of remaining habitat covers only 2.3 percent of the Earth's land surface. Each hotspot faces extreme threats and has already lost at least 70 percent of its original natural vegetation. Over 50 percent of the world's plant species and 42 percent of all terrestrial vertebrate species are endemic to the 34 biodiversity hotspots (MYERS et al. 2000). It is also one of the most remarkable regions of the world in terms of the biodiversity hotspots such that three of them have major extensions into Turkey: Caucasus, Irano-Anatolian and Mediterranean Basin (MYERS et al. 2000).

Material and methods

The Ichneumonidae samples were collected from Türkmen Mountain in Eskişehir Province, between May 2009-November 2009. There were 3 stations appointed to investigate of Ichneumonidae fauna depending on different altitudes (Table 1). The samples were obtained from grass-type plants by using a standard sweeping-net and Malaise trap. The samples are preserved in the collection of the Department of Biology, Faculty of Arts and Sciences at Süleyman Demirel University, Isparta, Turkey.

Table 1: Habitats, altitudes and coordinates of appointed stations.

Lokation	Habitat	Altitude	Coordinates
1. Station	<i>Pinus nigra</i> , <i>Triticum sativum</i> , <i>Hordeum vulgare</i>	1000 m	39° 33'16.00" N 30° 27'32.00" E
2. Station	<i>Pinus sylvestris</i> , <i>Quercus pubescens</i>	1300 m	39° 27'12.00" N 30° 24'22.00" E
3. Station	<i>Pinus nigra</i> , <i>Pinus sylvestris</i>	1500 m	39° 28'29.00" N 30° 21'29.00" E

List of the species

Subfamily Pimplinae

Pimplaspuria (GRAVENHORST 1829)

Pimplaspuria GRAVENHORST 1829 – Ichn. eur. 3: 179.

Material examined: 1. Station, 1000 m, 15.08.2009, 1♀.

General distribution: Western Palearctic, Eastern Palearctic, European, Oriental (YU & HORSTMANN 1997b).

Distribution in Turkey: Ankara-Şereflikoçhisar-AyaşveKaradenizBölgesi (ÖZDEMİR & KILINÇER 1990); Adana-Balcalı, Pozantı, Saimbeyli, Adıyaman-Gölbaşı, Edirne-Hadımağa, Gaziantep-Oğuzeli, Hatay-Dört Yol-Karınca, İçel-Namrun, Kırklareli-İğneada-Limanköy, Vize-Kömrüköy, Şanlıurfa-Atatürk Barajı, Tekirdağ-Işıklar (KOLAROV & BEYARSLAN 1994); Balıkesir-İvrindi-Güngörmez, Bilecik-Küplü, Bursa- Aksu, Cumalıkızık, İncirli, Yenişehir, Yeşiltarla, Çanakkale-Bayramiç-Evciler (KOLAROV et al. 1997); Çanakkale-Bozcaada-Merkez, Gökçeada-Aydıncık, Kale, Tigem, Ugurlu (KOLAROV et al. 1997); Erzurum-Oltu-Çamlıbel, Uzundere-Şelale (KOLAROV et al. 1999); Afyon-Bayat-Köroğlu, Sincanlı-Akören, Denizli-Tavas-Tekkeköy, Manisa-Gördes-Güneşli, Muğla-Marmaris-Değirmenyanı, Uşak-Banaz (KOLAROV et al. 2002); Çanakkale-Gelibolu-Evreşe, Edirne-TavukOrmanı, İstanbul-Sarıyer-Bilezikçi Çiftliği, Kırklareli-Kızılcıkdere, Tekirdağ-Çerkezköy (YURTCAN 2004), Adana- HalepÇamlığı (BUNCUKÇU 2008).

H o t s p o t s : Irano-Anatolian, Caucasus, Mediterranean Basin, Japan, Mountains of Central Asia.

***Itoplectis maculator* (FABRICIUS 1775)**

Ichneumon maculator FABRICIUS 1775 – Systema Entomologiae, sistens Insectorum classes, ordines, genera, species. Flensburgiet Lipsae. 832 pp.

Material examined: 3. Station, 1500 m, 12.09.2009, 1♂.

General distribution: Western Palearctic, Eastern Palearctic, European, (YU & HORSTMANN 1997b).

Distribution in Turkey: Ankara, Eskişehir, Konya, Nevşehir, Yozgat (ÖZDEMİR & KILINÇER 1990), Erzurum (KOLAROV et al. 1999), Çanakkale, İstanbul, Edirne, Kırklareli, Tekirdağ (YURTCAN 2004), Artvin, Bayburt, Erzurum, Gümüşhane, Rize, Kars (ÇORUH et al. 2005), Kasnak Meşesi-Isparta (KIRTAY 2008).

H o t s p o t s : Irano-Anatolian, Caucasus, Mediterranean Basin.

***Zaglyptus multicolor* (GRAVENHORST 1829)**

Polysphincta multicolor GRAVENHORST 1829 – Ich. Eur. Pars III. 1097 pp.

Material examined: 1. Station, 1000 m, 10.10.2009, 1♀.

General distribution: Western Palearctic, Eastern Palearctic, European Middle East (YU & HORSTMANN 1997b).

Distribution in Turkey: Adıyaman-Besni, Elazığ-Baskıl (KOLAROV & BEYARSLAN 1994), Isparta-Eğirdir-Gönen (GÜRBÜZ 2004), Kırklareli-Kayalıve Erzurum (ÇORUH 2005); Edirne-Meriç-Küplü, Tekirdağ-Uçmakdere (YURTCAN 2004), Adana-Halep Çamlığı (BUNCUKÇU 2008).

H o t s p o t s : Irano-Anatolian, Caucasus, Mediterranean Basin, Mountains of Central Asia.

***Oxyrrherixis carbonator* (GRAVENHORST 1807)**

Cryptus carbonator GRAVENHORST 1807 – Göttingen 476 pp.

Material examined: 1. Station, 1000 m, 07.06.2009, 1♀; 3. Station, 1500 m 07.06.2009, 1♂; 1. Station, 1000 m, 07.06.2009, 1♂; 3. Station, 1500 m, 27.06.2009, 1♂.

General distribution: Western Palearctic, Eastern Palearctic, European, Nearctic (YU & HORSTMANN 1997b).

Distribution in Turkey: Ankara, Eskişehir, Konya, Nevşehir, Yozgat (ÖZDEMİR & KILINÇER 1990), Erzurum (KOLAROV et al., 1999), Çanakkale, İstanbul, Edirne, Kırklareli, Tekirdağ (YURTCAN 2004), Artvin, Bayburt, Erzurum, Gümüşhane, Rize, Kars (ÇORUH et al. 2005).

H o t s p o t s : Irano-Anatolian, Caucasus, Mediterranean Basin, California Floristic Province.

****Acrodactyla quadrisculpta* (GRAVENHORST 1820)**

Ichneumon quadrisculptus GRAVENHORST 1820 – Monographia Ichneumonum Pedemontanae Regionis. Memorie della Reale Academia dell Scienze di Torino 24: 275-388.

Material examined: 3. Station, 1500 m, 12.09.2009, 1♂.

General distribution: Western Palearctic, Eastern Palearctic, European, Nearctic, Australia, Oriental (YU & HORSTMANN 1997b).

H o t s p o t s : Caucasus, Mediterranean Basin, California Floristic Province.

Subfamily T r y p h o n i n a e

***Tryphonatriceps* (STEPHENS 1835)**

Tryphonatriceps STEPHENS 1835 – III. Of. Brit. Ent., Mandibulata 7: 262.

Material examined : 1. Station, 1000 m, 07.06.2009, 1♂.

General distribution : Gageus, England, Italy, Lithuania, Central Europe, Moldova, Northern Europe, Russia, Spain, Turkey, Ukraine, Western Europe (YURTCAN et al. 2002).

Distribution in Turkey : Edirne, İçel (YURTCAN et al. 2002), Erzurum-İstanbul (KOLAROV 1994).

H o t s p o t s : Irano-Anatolian, Caucasus, Mediterranean Basin.

***Netelia (Netelia) fuscicornis* (HOLMGREN 1860)**

Paniscus fuscicornis HOLMGREN 1860 – Svenska Vetensk. Akad. Hendl. (n.f) **2** (8): 32.

Material examined : 3. Station, 1500 m, 10.10.2009, 1♂.

General distribution : Western Palearctic, Eastern Palearctic, European, Oriental (YU & HORSTMANN 1997b).

Distribution in Turkey : Hatay (KOLAROV 1987), Nevşehir-Ürgüp-Göreme-Karain (KOLAROV 1994), Edirne, Elazığ, Kahramanmaraş, Kırklareli, Tekirdağ (KOLAROV & BEYARSLAN 1994b), Kayseri-Erciyes, Konya-Merâm, Van, Hatay (KOLAROV 1995a), Balıkesir, Bursa (KOLAROV et al. 1997b), Adana, Ankara, Bayburt, Erzurum (KOLAROV et al. 1999), Ankara, Eskişehir, Kırşehir, Nevşehir (ÖZDEMİR 2001), Edirne, Kırklareli (YURTCAN et al. 2002), Kasnak Meşesi-Isparta (KIRTAY 2008).

H o t s p o t s : Irano-Anatolian, Caucasus, Mediterranean Basin, Himalaya, Mountains of Central Asia, Japan, Western Ghats and Sri Lanka.

Subfamily Cremastinae

***Pristomerus vulnerator* (PANZER 1799)**

Ichneumon vulnerator G.W.F. PANZER 1799 – Faunae Insectorum Germanicae. Heft 70-72.

Material examined : 3. Station 1500 m, 12.09.2009, 3♀.

General distribution : Europe, China, India, Japan, Korea, Siberia, Turkey (KOLAROV 1995b, 1997b).

Distribution in Turkey : Ankara, Bursa, Karadeniz region, Samsun, Tekirdağ (KOLAROV 1995b, 1997b).

H o t s p o t s : Irano-Anatolian, Caucasus, Mediterranean Basin, Mountains of Central Asia, Japan, Western Ghats and Sri Lanka.

Subfamily Cryptinae

***Dichrogaster longicaudata* (THOMSON 1884)**

Hemiteles longicaudatus THOMSON 1884 – Opuscula Entomologica. Lund. **X**: 939-1028.

Material examined : 2. Station, 1300 m, 15.08.2009, 1♀ : 1. Station 1000 m, 15.08.2009, 1♂ : 2. Station, 1300 m, 24.05.2009, 1♂.

General distribution : Western Palearctic, Eastern Palearctic, European, Nearctic, (YU & HORSTMANN, 1997b).

Distribution in Turkey : Isparta, Eğirdir (KOLAROV & GÜRBÜZ 2007), Kasnak Meşesi-Isparta (KIRTAY 2008).

H o t s p o t s : Mediterranean Basin.

***Cryptus spinosus* (GRAVENHORST 1829)**

Cryptus spinosus GRAVENHORST 1829 – Ichneumonologia Europaea. Pars II. Vratislaviae. 989pp.

Material examined: 1. Station, 1000 m, 23.05.2009, 1♂: 3. Station, 1500 m, 18.10.2009, 1♂: 3. Station, 1500 m, 15.08.2009, 1♂.

General distribution: European, Western Palearctic (YU & HORSTMANN 1997b).

Distribution in Turkey: Adana (KOLAROV 1995), Isparta-Gökçay (GÜRBÜZ & KOLAROV 2008).

H o t s p o t s : Mediterranean Basin.

Subfamily D i p l a z o n t i n a e

***Diplazon laetatorius* (FABRICIUS 1781)**

Ichneumon laetatorius FABRICIUS 1781 – Spec. Ins. Tom. I. 552 pp.

Material examined: 1. Station, 1000 m, 18.07.2009, 1♀: 1. Station, 1000 m, 10.10.2009, 1♀.

General distribution: Australia, Palearctic, Ethiopia, Europe, Nearctic, Neotropical (YU & HORSTMANN 1997b).

Distribution in Turkey: Ankara (TUATAY et al. 1972), İstanbul (KOLAROV 1989a), Ankara (ÖNCÜER 1991), Edirne, Tekirdağ, Kırklareli (YURTCAN et al. 1999), Isparta-Şarkikaraağaç-Merkez-Sav-Gönen (GÜRBÜZ 2004), Adana-Halep Çamlığı (BUNCUKÇU 2008).

H o t s p o t s : Irano-Anatolian, Mediterranean Basin, Caucasus, Mountains of Central Asia, Western Ghats and Sri Lanka, Mountains of Southwest China, New Zeland, Japan, Philippines, Indo-Burma, California Floristic Province, Madagascar and Indian Ocean Islands, Cape Floristic Region, Maputaland-Pandoland- Albany, Cerrado Atlantic Forest, Chilean Winter Rainfall-Valdivian Forests, Tropical Andes, Mesoamerica, Madrean Pine- Oak Woodlands.

Subfamily B a n c h i n a e

***Exetastes gracilicornis* (GRAVENHORST 1829)**

Exetastes gracilicornis GRAVENHORST 1829 – Ichneumonologia Europaea Pars. III Vratislaviae.

Material examined: 1. Station, 1000 m, 18.07.2009, 1♀: 3. Station 1500 m, 15.08.2009, 3♂♂: 2. Station, 1300 m, 18.10.2009, 2♂♂, 2♀♀.

General distribution: Western Palearctic, Eastern Palearctic, European, (YU & HORSTMANN 1997b).

Distribution in Turkey: Osmaniye-Fenk Plateau (GÜRBÜZ et al. 2008).

H o t s p o t s : Caucasus, Mediterranean Basin, Mountains of Central Asia.

Subfamily M e t o p i i n a e

***Chorinaeus funebris* (GRAVENHORST 1829)**

Exochus funebris GRAVENHORST 1829 – Ichneumonologia Europaea. Pars I. Vratislaviae. 827pp.

Material examined: 1. Station, 1000 m, 10.10.2009, 1♀.

General distribution: Western Palearctic, Eastern Palearctic, European, Nearctic (YU & HORSTMANN 1997b).

Distribution in Turkey: Eskişehir Türkmen Dağı, Trakya (KOLAROV 1989a).

H o t s p o t s : Mediterranean Basin, California Floristic Province.

Subfamily Ichneumoninae***Coelichneumon rudis* (FONSCOLOMBE 1847)**

Ichneumon rudis FONSCOLOMBE 1847 – Ichneumologie provençale. Annales de la société Entomologique de France (2) 5: 51-70.

Material examined: 2. Station, 1300 m, 10.10.2009, 2♀♀: 1. Station, 1000 m, 10.10.2009, 2♀♀.

General distribution: Western Palearctic, European (YU & HORSTMANN 1997b).

Distribution in Turkey: Adana- HalepÇamlığı (GÜRBÜZ et al. 2008).

Hotspots: Mediterranean Basin.

Subfamily Tersilochinae****Probes versutus* (HOLMGREN 1860)**

Thersilochus versutus HOLMGREN 1860 – Monographia ophonidum Sueciae. Kongliga Svenska Vetenskaps akademien Handlingar 2 (8): 1-158.

Material examined: 3. Station, 1500m, 15.08.2009, 1♀: 1. Station, 1000 m, 15.08.2009, 2♂♂: 2. Station, 1300 m, 15.08.2009, 2♂♂.

General distribution: Western Palearctic, European (YU & HORSTMANN 1997b), Bulgaria (KOLAROV 1987).

Hotspots: Mediterranean Basin.

Result and discussion

The dominance (D) describes the relative abundance of a species within a community. (TISCHER 1977).

It is measured as:

$$D = \frac{b}{a} \times 100$$

b= number of individuals of the species
a= number of individuals of all species

Dominance scale logarithmic after ENGELMANN (MACZEY 2004).

- Eudominant >32.0 ≤ 100 %
- Dominant > 10.0 ≤ 32.0 %
- Subdominant > 3.2 ≤ 10.0 %
- Recedent > 1.0 ≤ 3.2 %
- Subrecedent > 0.32 ≤ 1.0 %
- Sporadic ≤ 0.32 %
- Missing = 0 %

According to ENGELMANN's (1978) dominance scale, *Exetastes gracilicornis* and *Probes versutus* are dominant species. *Oxyrrherix carbonator*, *Cryptus spinosus*, *Dichrogaster longicaudata*, *Diplazon laetatorius*, *Coelichneumon rudis* and *Pristomerus*

vulnerator are subdominant species. *Pimplaspuria*, *Itopectis maculator*, *Zaglyptus multicolor*, *Acrodactyla quadrisculpta*, *Tryphon atriceps*, *Netelia fuscicornis* and, *Chorinaeus funebris* are recedent species. There is not any eudominant, subrecedent, sporadic and missing species in the research area (Table 2).

Table 2: Dominance of species and hotspots

Species	1. Station	2 Station	3. Station	D %	Category	Hotspots
<i>Pimplaspuria</i>	+	-	-	2.38	Recedent	Common
<i>Itopectis maculator</i>	-	-	+	2.38	Recedent	Common
<i>Zaglyptus multicolor</i>	+	-	-	2.38	Recedent	Common
<i>Acrodactyla quadrisculpta</i>	-	-	+	2.38	Recedent	Mediterranean Basin and Caucasus
<i>Oxyrrhexis carbonator</i>	+	-	+	9.52	Subdominant	Common
<i>Tryphona triceps</i>	+	-	-	2.38	Recedent	Common
<i>Netelia fuscicornis</i>	-	-	+	2.38	Recedent	Common
<i>Cryptus spinosus</i>	+	-	+	7.14	Subdominant	Mediterranean Basin
<i>Dichrogaster longicaudata</i>	+	+	-	7.14	Subdominant	Mediterranean Basin
<i>Diplazon laetatorius</i>	+	-	-	4.76	Subdominant	Mediterranean Basin and Caucasus
<i>Exetastes gracilicornis</i>	+	+	+	16.67	Dominant	Mediterranean Basin and Caucasus
<i>Chorinaeus funebris</i>	+	-	-	2.38	Recedent	Mediterranean Basin
<i>Coelich neumonrudis</i>	+	+	-	9.52	Subdominant	Mediterranean Basin
<i>Probles versutus</i>	+	+	+	11.90	Dominant	Mediterranean Basin
<i>Pristomerus vulnerator</i>	-	-	+	7.14	Subdominant	Common

D= Dominance, (+)= Species are shown in the research area, (-)= Species are not shown in the research area

Within this study identified two species are new records for Turkish fauna. These are *Probles versutus* and *Acrodactyla quadrisculpta*. Turkey has three hotspots. These are Caucasus, Irano-Anatolian and Mediterranean Basin (MYERS et al. 2000). The Türkmen Mountain is not included in these three hotspots, but Türkmen Mountain is near the Irano-Anatolian and Mediterranean Basin hotspots. *Acrodactyla quadrisculpta* found Mediterranean Basin and Caucasus hotspots (Table 2). Probably, *Acrodactyla quadrisculpta* will arrive at Irano-Anatolian hotspot, because Türkmen Mountain is near the Irano-Anatolian hotspot. Also *Probles versutus* was found only in the Mediterranean Basin hotspot. The results showed that Türkmen Mountain is an important transit area between Mediterranean Basin and Irano-Anatolian hotspots.

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Zusammenfassung

Die Ichneumonidenfauna (Hymenoptera, Ichneumonidae) des Berges Türkmen in der türkischen Provinz Eskişehir wurde im Zeitraum Mai 2009 bis November 2009 untersucht. 15 Arten aus 15 Gattungen und 9 Unterfamilien wurden nachgewiesen, darunter 5 Arten Pimplinae, je zwei Arten Tryphoninae und Cryptinae, sowie je eine Art aus den Unterfamilien Tersilochinae, Cremastinae, Ichneumoninae, Diplozantinae, Banchinae und Metopiinae. Zwei Arten (*Acrodactyla quadrisculpta*, *Probes versutus*) stellen Erstnachweise für die Türkei dar. Auf Basis von Literaturangaben wurden Angaben zu Verbreitungen und Synonymien gegeben.

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